R E P O R T R E S U M E S

ED 017 737 VT 005 133

DESIGNING AN ORGANIC CURRICULUM.

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PUB DATE NOV 66

EDRS PRICE MF-$0.25 HC-$0.56 12P.

DESCRIPTORS- *INTEGRATED CURRICULUM, *EDUCATIONAL CHANGE, *CURRICULUM DESIGN, RESEARCH NEEDS, CURRICULUM RESEARCH, INTEGRATED ACTIVITIES, INSTRUCTIONAL TECHNOLOGY, EDUCATIONAL OBJECTIVES, INDIVIDUAL NEEDS, CURRICULUM DEVELOPMENT, *EDUCATIONAL INNOVATION, *HIGH SCHOOL CURRICULUM, ORGANIC CURRICULUM,

THE PROBLEMS AND SHORTCOMINGS ASSOCIATED WITH OUR PRESENT-DAY PROGRAM OF EDUCATION INDICATE A NEED FOR RADICALLY MODIFYING THE SYSTEM IN ORDER TO DESIGN AN EDUCATIONAL PROGRAM WHICH WILL BE RESPONSIVE TO THE PRESENT-DAY NEEDS OF STUDENTS. THE DESIRED PROGRAM SHOULD PERMIT THE MAXIMUM SELF-ACTUALIZATION OF EACH INDIVIDUAL AND ALLOW HIM TO DECIDE WHICH OPTION TO CHOOSE AFTER HIGH SCHOOL GRADUATION, NOT BEFORE. THE FIRST STEP IN BUILDING SUCH A STUDENT-CENTERED, ORGANIC CURRICULUM WOULD BE TO DETERMINE SPECIFIC AND MEASURABLE BEHAVIORAL ATTAINMENTS NEEDED FOR ENTRY INTO A VARIETY OF POST-HIGH SCHOOL ACTIVITIES AND TO DESCRIBE LEARNING EXPERIENCES WHICH WOULD LEAD TO THE DESIRED BEHAVIORAL OUTCOMES. THE PROGRAM WOULD INCLUDE ACADEMIC AND OCCUPATIONAL TRAINING, PERSONAL DEVELOPMENT, REAL WORK EXPERIENCE, PERSONAL AND VOCATIONAL COUNSELING, AND SOCIAL AND RECREATIONAL ACTIVITIES. THE INTEGRATION AND INTERACTION OF THESE COMPONENTS WOULD BE A RESULT OF CAREFUL SYSTEMS DESIGN. THE CURRICULUM WOULD BE LEARNER-ORIENTED, AND EACH ACTIVITY WOULD RELATE LOGICALLY TO ALL OTHER ACTIVITIES AND LEAD TO THE EFFICIENT ATTAINMENT OF BEHAVIORAL GOALS. AN ORGANIC CURRICULUM WOULD NECESSARILY HAVE TO BE INTERESTING, CHALLENGING, AND MOTIVATING TO EACH STUDENT. IT WOULD UTILIZE APPROPRIATE SELF-POSED AND SELF-INSTRUCTIONAL TECHNOLOGY AND MAXIMALLY ACCOMMODATE INDIVIDUAL DIFFERENCES IN LEARNING RATE. IT SHOULD BE DESIGNED SO EACH STUDENT WILL SUCCEED, AND YET IT SHOULD BE RIGOROUS IN LEVEL AND CONTENT. RESEARCH AND DEVELOPMENT EFFORTS IN CURRICULUM HAVE BEEN SMALL AND FRAGMENTED TO DATE, AND A MASSIVE RESEARCH EFFORT WILL BE REQUIRED TO DEVELOP AND VALIDATE AN ORGANIC CURRICULUM. (BS)

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ED017737

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Robert M. Morgan and David S. Bushnell

Bureau of Research
U.S. Office of Education
Washington, D.C.

November, 1966

VT005133

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In the early 50's American education experienced its first widespread public scrutiny. In reaction to the dramatic scientific achievements of the Soviet Union at that time, the American people wanted to know, "Why are we behind?" In our frustration and bewilderment at having been bested by our cold war antagonists, we turned critically to the principal shapers of our engineers, scientists, and mathematicians in our schools. This attention resulted in significant changes in the educational system. In the decade following "Sputnik," whole subject matter areas were revised. We now have new math, modern physics, and new reading programs. Programmed instruction, computer-assisted teaching, and instructional television are passing from the experimental to the operational phase. Among the more important consequences of this focused attention is the realization by the public that the schools can change.

For years the United States has led the world in its commitment to the goal of equal educational opportunity for all citizens. Universal education for virtually all American children between the ages of 6 and 13 has been achieved. At the high school level, the United States leads all other nations in the percentage of 17-year olds enrolled in full-time schooling. A recent UNESCO survey reported the United States with 81 percent, England with 56 percent, Belgium with 30 percent, and Germany with 13 percent of this age group enrolled in full-time education. Almost 70 percent of the youngsters in the United States who start in school at age 6 actually graduate with high school diplomas.

Our leadership at the college level is indicated by the fact that only 4 percent of college-age youth in the European Common Market nations receive university degrees in contrast to 20 percent of their American counterparts. These seem to be heartening figures, especially when viewed in light of today's employment statistics.

It is true that we are educating more of our young people than any other nation -- but is that sufficient? Last year's class of college graduates represented only about 20 percent of those who first began school. Nineteen percent of this group left school before the eleventh grade; 30 percent didn't finish high school. Thirty-five percent entered college but only 20 percent graduated with a Bachelor's degree. Thus, 8 out of 10 of these students were candidates for jobs requiring less than a college degree.

Yet only one of these 8 received any kind of occupational training in the public schools! The remaining 70 percent have historically had a limited number of options open to them. They can take entry-level jobs that have little skill requirements; but these jobs are becoming fewer. They can be

employed and trained by private industry in on-the-job or vestibule training programs; however, rapid economic expansion and changes in technology have made it more difficult and expensive for industry to provide this kind of training. A relatively small numbe' can engage in apprentice training, but, again, there are a limited number of such programs available. Some will enter post high school vocational or technical training in community colleges or private institutes.

It seems clear that more Federal funds are needed to assist the established public educational institutions to develop and make available relevant educational and training programs which are responsive to the present economy.

A soaring technology and a healthy modern economy largely depend upon our ability to adapt to changes in productive capacity. Not only are engineers needed to design and install new and improved equipment, but more trained technologists are required to plan and manage production, to maintain automated apparatus, to sell and service the product, and to conduct research for newer and better products. A growing modern economy also requires more and more teachers, scientists, and professional managers, advertising and sales people, computer programmers and technicians, and machanics and maintenance workers of all kinds.

Young jobseekers, faced with a continuing shift from production-oriented occupations to service occupations, require a broad base of cognitive, communicative, and social skills. Many of the former types of entry-level occupations are now unavailable to youngsters entering the labor market. Further, while qualifying for an entry-level occupation is a necessity, a person's first job can no longer be viewed as a final career commitment but should be looked upon as the first in a series of job changes leading, hopefully, to a stable and satisfying career.

Unfortunately, much of what is now taught in our public schools fails to recognize that technology is generating profound changes in the nature of work. The tendency in the past to separate general and vocational education has penalized both those who are college-bound and those who plan to terminate their formal education at the end of high school or junior college. The academically oriented students are directed to college preparatory programs which will enhance their chances for college admission. They have little opportunity to acquire a knowledge of the occupational world in which they will live and earn a living as adults. At the same time, vocational students receive too little opportunity to develop competence in the basic educational skills which they must have if they are to cope adequately with present day society.

Those who plan to go on to college are not prepared to cope with the question, "What happens if I leave college before graduation?" On the other hand, those exposed to current vocational programs frequently find themselves being trained for a narrow range of job skills. Even if such students should qualify for their first job, they are still faced with the need to adapt to a changing labor market. A third and large segment of our public school population is not enrolled in either vocational preparatory or college oriented programs. These

"general" students often receive a diluted program which in too many cases provides little academic or occupational preparation that is useful to them in the adult world.

From the perspective of providing for the optimum development of all students, the present allocation of resources and the types of curriculum available in the secondary schools are inadequate.

PURPOSE

The problems and shortcomings associated with our present-day program of education indicates a need for a major redefinition of goals and an overhaul of the educational process. Fortunately, the technology which created many of these problems offers some hope for their solution. The computer, for example, can serve as an intermediary between employers and school counselors, making possible far better information systems for funneling industry's job needs to curriculum planners in the schools. Flexible scheduling through computers can make possible the development of learning experiences to meet the particular needs of individual students; and indications are that computer-mediated instructional techniques can succeed in permitting the student to involve himself at his own rate in the learning process. Even computer games have been successfully employed as a method of teaching teenagers to think through appropriate career choices.

The use of instructional television, single concept films, video-tapes, teaching machines, and simulators should be commonplace resources in the classroom by 1975. Textbooks will appear which will gear the information to the background and reading level of the student. Experiments with tutorial programs employing older students and subprofessionals offer hope for giving more intensive attention to those children requiring it, while at the same time helping to offset the spiraling cost of education. Each of these examples illustrates that we are in the take-off stage and can, with appropriate planning and funding, achieve the outer reaches of educational excellence.

Under the stimulation of Federal legislation, new opportunities for research on major curriculum redesign are now possible. These opportunities are occuring at a time when teachers, curriculum planners, and school administrators are under pressure to provide today's youngsters with the kind of education which is relevant to living in today's world. It would be a mistake, however, to let employers with their frequently narrow entry-level skill requirements or even parents with their sometimes unrealistic career expectations dictate the type of education which should be available in our schools. The educator and the employer must work together to determine the appropriate knowledge, skills, and attitudes which will qualify today's students for their life roles as employed adults and citizens.

Unless we radically modify our present system, we will not succeed in designing an educational program which will be responsive to the present day needs of students. The desired program should permit the maximum self-actualization of

each individual. If a youngster leaves school before graduation, he should leave with functional skills. The student who graduates from the program should possess the necessary qualifications for maximum flexibility in his post high school activities. He might enter a university or a community college and pursue an academic program. He might enter a community college or a technical school and receive post high school occupational training. He should also have entry-level occupational skills which permit him to go to work. He should have the additional option of continuing his education in an adult education program, if he chooses. The key point is that he should be able to decide which option to choose after high school graduation, not three or four years before!

AN ORGANIC CURRICULUM

The first step in building such a student-centered curriculum is to study those behavioral attainments needed by the individual for entry into a variety of post high school activities. Whenever possible, these requirements should be stated specifically and in measurable behavioral terms. Following the lead of the systems analyst, we should describe specifically and precisely as possible the learning experience which would lead to the desired behavioral outcomes.

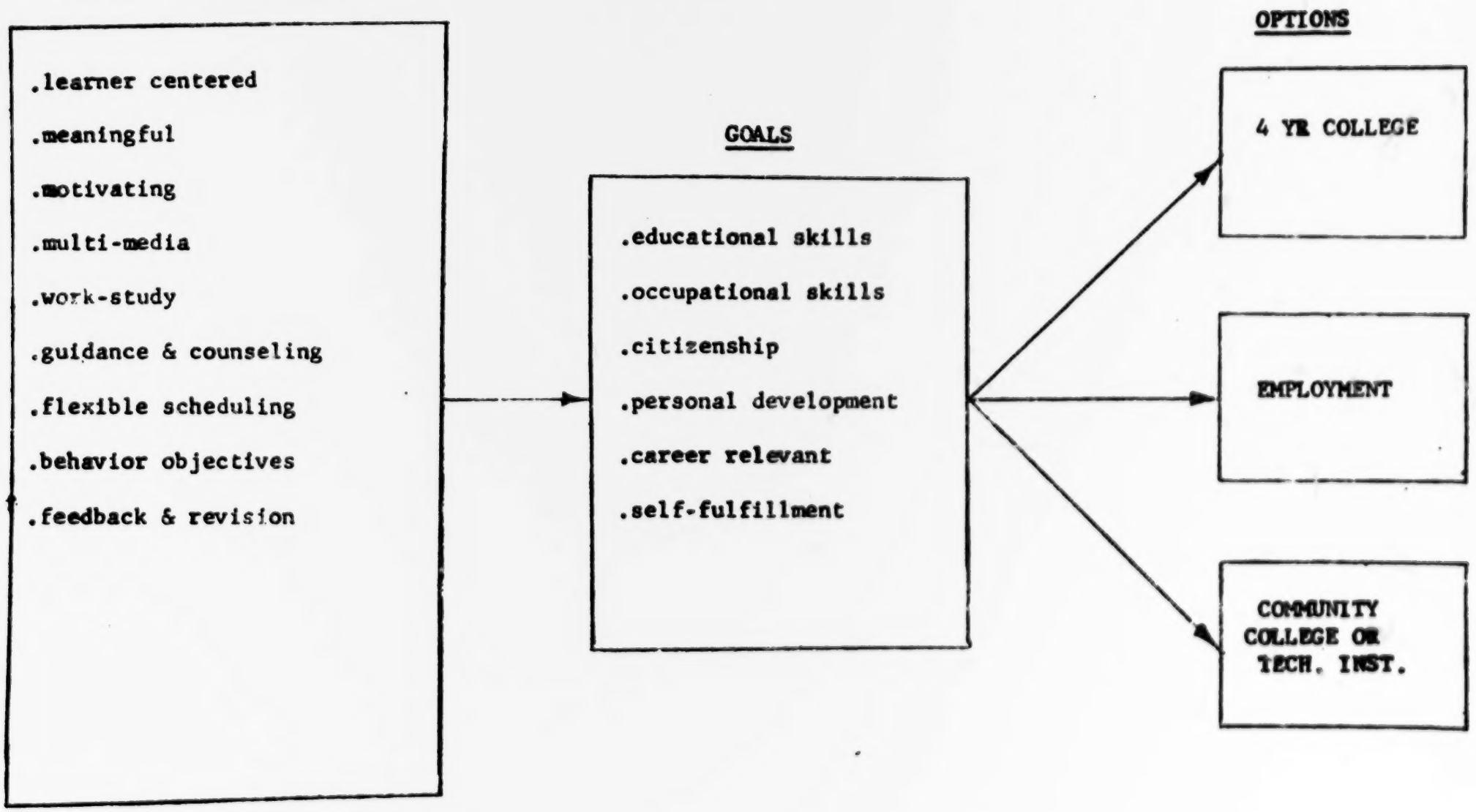
The ingredients of a high school program which will assure the attainment of these specifications will certainly include academic as well as occupational training but should also include such components as personal development, real work experience, and personal and vocational counseling (see Figure I.). Even the avocational or school-sponsored recreation or social programs may be considered an integral component in this system. Each of these components and sub-parts must be defined in terms of its contribution to the attainment of the specified behavioral objectives.

The most important feature of such a curriculum is that it is learner-oriented rather than process or subject-matter centered. The integration and interaction of the components will be a result of careful systems design. There will be no discrete demarcation between academic and occupational training or between these and other parts of the system. The truly integral curriculum must be developed so that each activity relates logically to all other activities and leads to the efficient attainment of the behavioral goals.

A massive research effort is required to develop and validate this system. Such an effort is presently feasible and can produce significant improvements in the learning process. An "organic" curriculum, as envisioned, would necessarily have to be interesting, challenging, and motivating to each student. It would probably utilize appropriate self-paced and self-instructional technology and maximally accommodate individual differences in learning rate. It should be designed so each student will succeed and yet it should be rigorous in level and content. Furthermore, after thorough experimentation and revision, the integral curriculum should be capable of implementation in or adaptable to many different comprehensive school systems in the Nation; and it should be cost effective in the implementation stages.

AN ORGANIC CURRICULUM

Figure No. 1



In general, the overall design of this curriculum should:

(1) Integrate academic and vocational learning by appropriately employing vocational preparation as one of the principal vehicles for the inculcation of basic learning skills. In this way learning could be made more palatable to many students who otherwise have difficulty seeing the value of a general education.

(2) Expose the student to an understanding of the "real world" through a series of experiences which capitalize on the desire of youth to investigate for himself.

(3) Train the student in a core of generalizable skills related to a cluster of occupations rather than just those related to one specialized occupation.

(4) Orient students to the attitudes and habits which go with successful job performance and successful living.

(5) Provide a background for the prospective worker by helping him to understand how he fits within the economic and civic institutions of our country.

(6) Make students aware that learning is life-oriented and need not, indeed must not, stop with his exit from formal education.

(7) Help students cope with a changing world of work through developing career strategies which can lead to an adequate level of income and responsibility.

(8) Create within the student a sense of self-reliance and awareness which leads him to seek out appropriate careers with realistic aspiration levels.

There are many unanswered questions that must be researched before such a curriculum can become operational. The problem of logistics alone are large and complex. How do you control the flow of students through the program without inhibiting individualized learning? Without the traditional "Carnegie units," how can school accreditation be achieved? As the roles of teachers change, will the emerging roles be acceptable? Would this system work better in a 48-week time cycle than in a 36-week cycle? How can the guidance activity contribute more effectively toward accomplishing the system objectives? How can present instructional media be most effectively used and what will be the nature of required new media? What are the problems involved in cataloging and programming the specific behavioral objectives of an entire curriculum, especially one as ambitious as this?

These and many other fundamental questions must be answered before we reach the "Kittyhawk" phase of what could become a moonshot for education.

CURRENT PROGRAMS

While most of the research and development efforts in curriculum have been small and fragmented to date -- directed to the improvement of a particular subject matter area -- more recent pilot efforts to redesign an entire curriculum are in evidence. A number have been focused on the problem of keeping young people in the system long enough for them to benefit from the experience. The most important feature that characterizes these efforts is the integration of two educational areas that have been traditionally quite separate -- the academic and the vocational.

In Richmond, California, for example, a major effort was made to integrate the vocational and general educational curricula. This was done by redesigning the content of traditionally-taught subjects so that they related as much as possible to job training programs. Math was taught by means of job-related examples and problems. Communication skills were related to performance requirements on-the-job. What were at one time judged to be potential dropouts in the tenth grade became, by their senior year in high school, candidates for technical training at nearby junior colleges.

Another effort in relating the verbal-skill-oriented high school's general education program to the interests of many students was carried out by an M.I.T. curriculum study group. Working with a group of dropouts, they successfully managed to capture and hold the interest of youngsters who rejected the normal pattern of schooling. It was necessary to develop a free interchange among the different academic subject matters, bringing together various pieces of learning into a cohesive whole, in which these areas are not fragmented but have an overall direction and purpose. By following this course of action, the possibility of early failure was minimized as youngsters moved from the relatively unstructured atmosphere of the elementary school into the more structured curriculum of the secondary school.

Job Corps centers have provided an excellent opportunity for designing learner-centered programs independent of many of the traditional constraints. In trying to define what the end product of such a program should be, the Job Corps educational planners determined that the economically self-sufficient, socially adaptive citizen needs many of the things offered by the traditional school system and much that is not. He not only needs basic educational skills but he needs to know about the workings of our society and his role in it; he needs to develop a realistic and favorable self-concept; he needs several career strategies to be able to operate effectively in our free enterprise system; and he needs the personal development that will permit him to make socially adaptive responses.

THE PROGRAM PLAN

These and other experiences point up the need for a coordinated research effort that can lead to the construction of an "organic" curriculum.

A research project for which there is pressing need is a parametric experimental analysis of the instructional process. The first step in this experiment would be the definition of the behavioral objectives for the content of selected courses and the instructional strategies would then be planned. These strategies involve the selection or design of modular instructional activities which would use whatever media or method or combination of these that appears to be most appropriate for the attainment of the objectives. The method/media mix for any given sequence of objectives might include programmed instruction, single concept films, text readings, tutorial sessions, group discussions, computer-assisted instruction, slide-tape presentations, etc. The optimum mix of learning experiences would be developed by systematically varying the method/media permutations and testing for their teaching effectiveness. (Figure No. 2 is a functional flow chart of a systems-designed instructional model.)

This validation of the learning experiences requires sensitive and sophisticated instruments for frequent measurement of behavioral objective attainment. Implicit in this system is that the student only learns what he doesn't already know and that he will move as rapidly as his ability and motivation permit.

The behavioral objectives and information about what method/media combinations are most appropriate for teaching students of varying abilities and interests are then stored in a computer. When the student enrolls in the course, he is measured in terms of his entry performance on a representative sample of the behavioral objectives and this information is fed into the computer. The computer then looks at the characteristics of the student and how much he already knows and prescribes an empirically validated learning package for him. When this package is completed, the learner will be retested and the next learning package will be prescribed.

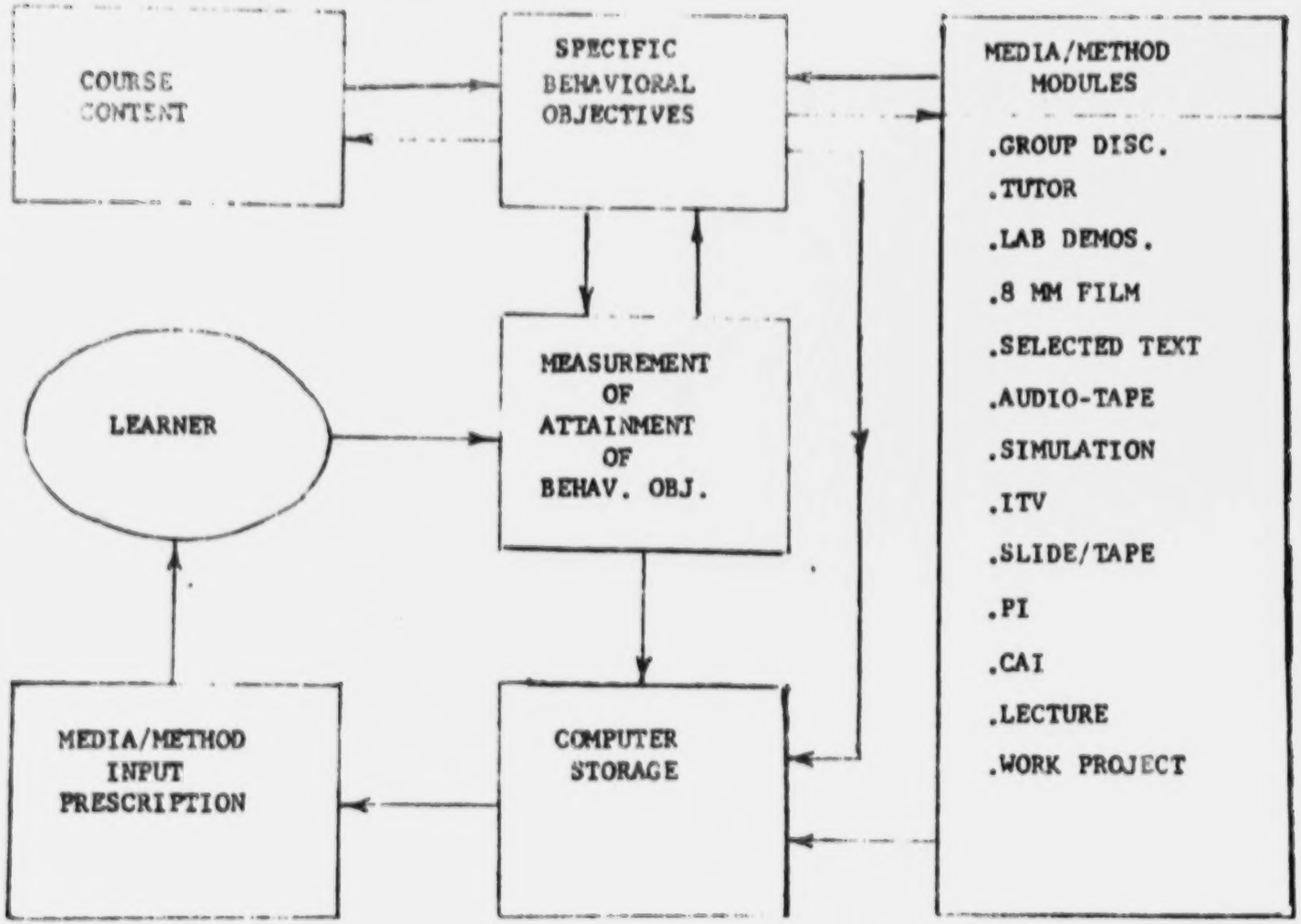
This will be "programmed instruction" in the broadest and most desirable sense. The student will have almost immediate knowledge of results, will work at his own rate and will have a high proportion of success experience in the learning situation. It is likely that much of the material in this system will be self-instructional.

While this experiment involves only single courses, the model should prove equally effective with an entire curriculum. The utility of such an instructional system in the curriculum that has been described should be clear. Indeed, the curriculum visualized probably could not work without such a flexible and individualized instructional program.

A study that systematically analyzes the effect on learning of all the major variables should have great value for educational planners but it is only a first step in building an optimum curriculum. Shown in Figure 3 is a functional flow chart identifying some of the more obvious activities that must be undertaken. Behavioral objectives must be defined and classified so that they are acceptable and useful to the pilot schools. Indeed the teaching staff and curriculum planners and administrators of these schools should become intimately

MODEL FOR A SINGLE COURSE INSTRUCTIONAL SYSTEM

Figure No. 2

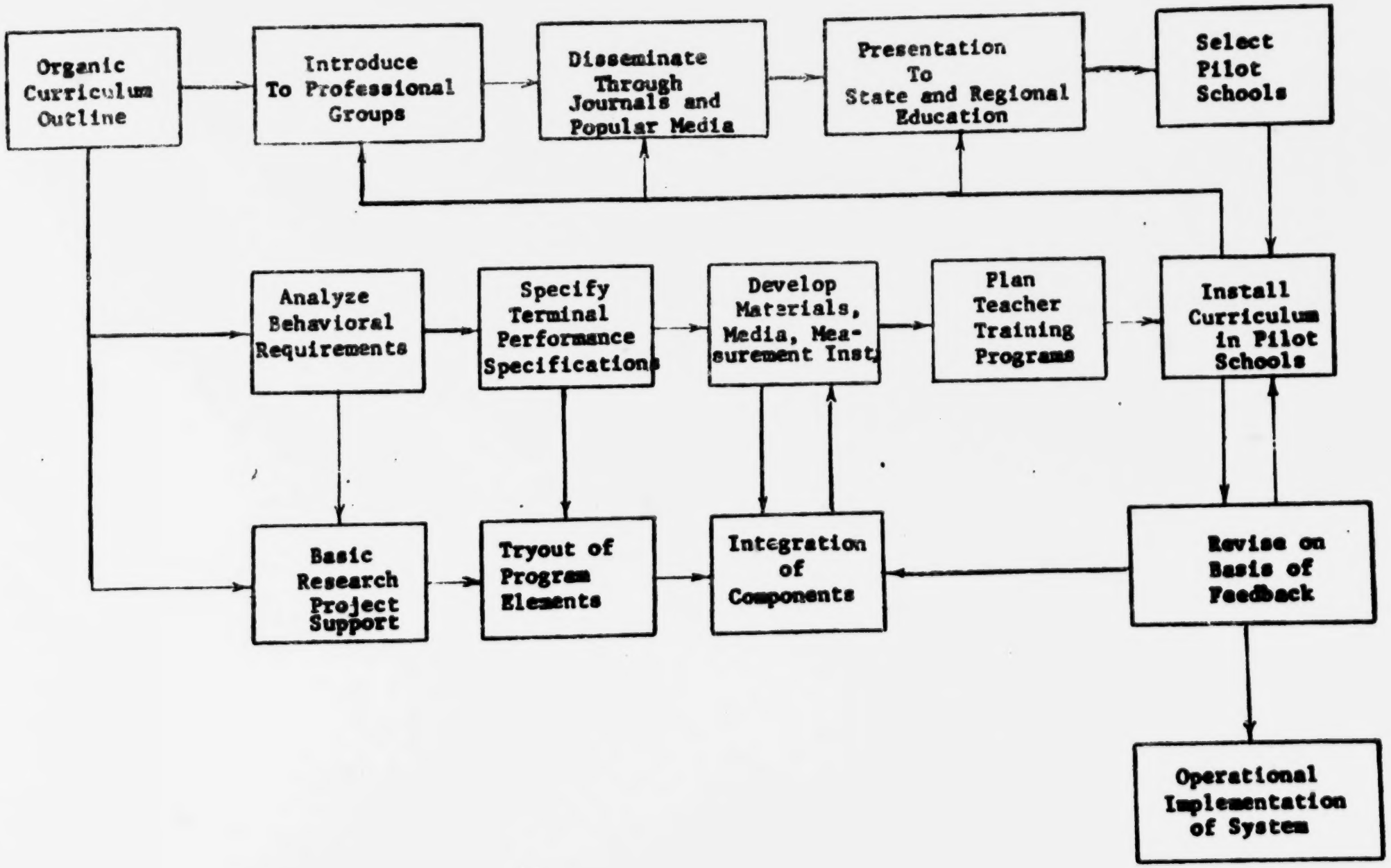


involved in the effort at its inception. Much research and validation of program elements must be completed before a new system can be installed in a school for practical testing. The criteria for measuring the success of a systems-designed curriculum must include longitudinal data on the post-high school performance of the students.

As important as attempting to build a demonstrably superior educational program is taking all the measures necessary to insure its acceptance by professional educators and parents. An exotic program that is not feasible for adoption in other schools will be of little value. It is encouraging to note that the resources essential to such an undertaking are available and that there are schools willing to participate in these innovational activities. The concept of a truly integral and excellent educational experience can become reality for the Nation's young people.

PLAN FOR IMPLEMENTATION

Figure No. 3


Organic Curriculum Outline
Introduce To Professional Groups
Disseminate Through Journals and Popular Media
Presentation To State and Regional Education
Select Pilot Schools
Analyze Behavioral Requirements
Specify Terminal Performance Specifications
Develop Materials, Media, Measurement Inst.
Plan Teacher Training Programs
Install Curriculum in Pilot Schools
Basic Research Project Support
Tryout of Program Elements
Integration of Components
Revise on Basis of Feedback
Operational Implementation of System